

# Radiological evidence of constipation in urinary tract infection

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## Abstract

**Little objective evidence has been published to support the claim that constipation is an important contributory factor in recurrent urinary tract infection (UTI) in childhood. Using a radiological scoring system, two observers assessed faecal loading from abdominal radiographs of children with proved UTIs. There was a significant increase in the degree of faecal loading in children with UTI when compared with controls ( $r=0.237$ ). This difference was mainly accounted for by girls with recurrent (greater than five) UTIs. This study confirms an association between recurrent UTI and faecal loading. Further studies are needed to establish if there is a causal relationship and benefits from treatment.**

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**Keywords:** urinary tract infection, constipation, abdominal radiograph.

The coexistence of severe functional constipation and repeated urinary tract infection (UTI) has been described by a number of authors and it is thought that this is due to the mechanical effect of a loaded rectum and sigmoid colon distorting and displacing the bladder and elongating the urethra, thus causing hydronephrosis and impaired bladder emptying.<sup>1-3</sup> We have shown that constipation is frequently associated with impaired bladder emptying.<sup>4</sup> Others have described large rectal reservoirs found by rectal examination and manometry in children with UTI even in the absence of a history of constipation.<sup>1</sup> The aim of our present study was to discover retrospectively the prevalence of constipation (as shown by faecal loading on radiography) in a group of children with single and recurrent UTI and to investigate the association between the recurrent infections and the presence of faecal loading.

## Patients and methods

We reviewed 61 children (13 boys, 48 girls), aged 2-14 years (median 6 years), who had been referred to a paediatric nephrology clinic for investigation of UTI. All the children had an abdominal radiograph within three months of a proved UTI (midstream or clean catch), defined as a count of  $>10^5$  viable organisms/ml. The number of infections before investigation and presenting symptoms were obtained from the clinical notes. The control group comprised 33 children (aged 2-14 years,

median age 7.5 years) who had an abdominal radiograph for the investigation of the following: haematuria ( $n=11$ ), sibling of a child with vesicoureteric reflux ( $n=4$ ), glomerulonephritis or proteinuria ( $n=4$ ), or further evaluation of anomalies detected during an ultrasound screening programme ( $n=14$ ). A negative midstream urine specimen was obtained from all children.

A radiological scoring system for faecal loading described by the authors was used to grade faecal loading into four categories from 0-3 (none to severe).<sup>5</sup> This grading system was used by two experienced observers independently to score each radiograph and, when agreement could not be reached by the two observers, these cases were referred to an arbitrator (an experienced paediatric radiologist). The faecal loading score was compared with the number of UTIs and statistical analysis carried out using Spearman's rank correlation.

## Results

There were 33 control children (no UTI), 24 with a history of one UTI (11 girls), 24 with two to five UTIs (21 girls), and 13 with more than five UTIs (all girls). In those children who had not experienced UTI, abdominal radiography showed moderate and severe (grade 2-3) faecal loading in 21%, in those with one UTI, 38%, two to five UTIs, 50%, and more than five UTIs, 54%. There was agreement between the two observers in all but four cases, and these were all one category disagreements (0-1 or 2-3) - the third arbitrator made a final decision on the category. Using Spearman's rank correlation there was a significant association between the degree of faecal loading and the number of urinary tract infections with  $r=0.237$  ( $p<0.05$ ).

## Discussion

Constipation may be defined in a number of different ways which describe reduced frequency and increased difficulty or discomfort during defaecation. Clayden's definition of constipation is delay in defaecation leading to distress and is, perhaps, the most widely used.<sup>6</sup> However, we believe the simplest and most useful clinical definition is the passage of fewer than three stools per week.<sup>7</sup> This view is based on data on the bowel habit of normal children.<sup>8</sup> Although the degree of faecal loading, as seen on a plain abdominal radiograph, is not synonymous with constipation, we have shown that there is a very close correlation between the two.<sup>5</sup> Furthermore, other authors have also

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suggested that this is the case and have used the degree of faecal loading shown on a plain abdominal radiograph to discuss whether or not constipation is present.<sup>9</sup> The inter-relationship between constipation and abnormalities of the urinary tract has been described previously<sup>2,4</sup> and it is postulated that the reason for this is a mechanical effect of the full rectum displacing the bladder, distorting the bladder base, elongating the urethra, and causing mural irregularity. Inability to void is an additional finding and, with bladder dyskinesia, may be responsible for the association with infection.<sup>1</sup>

Other possible explanations include neurological or psychological problems giving rise to poor emptying of bladder and rectum or an effect of bacterial endotoxins giving rise to similar problems.<sup>10</sup>

We have previously demonstrated that the increased postmicturition residue and dilated upper renal tract seen in children with constipation improves with aggressive treatment of constipation,<sup>4</sup> which may reduce further episodes of UTI. We have also shown that there is a relationship between recurrent UTI and faecal loading and, although the statistics refer to the entire group, the majority of cases of recurrent UTI were female, as is usually the case.

We have confirmed that faecal loading, and thus constipation, is a significant problem in children with recurrent UTI and, as others have shown, that aggressive treatment of constipation can help management of urinary tract problems. Our study emphasises the need to obtain an accurate assessment of bowel habit followed by appropriate advice to parents and general practitioners.

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